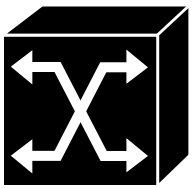
Cisco LightStream 1010

This chapter provides information on the Cisco LightStream 1010 asynchronous transfer mode (ATM) switch. The information is organized into the following sections:

- Product Overview
- Standard Features
  - AtmDirector
  - CiscoView for the LightStream 1010
- Configuration Guidelines
  - Carrier Modules and Port Adapters
  - Example Orders
- Configuration Worksheets

Note Documentation for the LightStream 1010 ATM switch is available in two forms: on a CD-ROM called Cisco Connection Documentation, Enterprise Series (formerly called UniverCD) and printed books. You can request a free copy of the documentation CD when you place an order and have the option of subscribing to a CD update service. A user guide ships with each switch.

You can also access Cisco technical documentation on the World Wide Web URL http://www.cisco.com. For more information, see the chapter "Documentation" at the end of the catalog.



Product Overview

The LightStream 1010 is the first of a series of new switches from Cisco Systems that represents the next generation of workgroup and campus ATM switching systems. The LightStream 1010 is a 5-Gbps modular switch designed for use in either the workgroup or the campus, depending upon the nature of the interfaces employed.

The LightStream 1010 uses a five-slot, modular chassis featuring the option of dual, fault-tolerant, load-sharing power supplies. The central slot in the LightStream 1010 is dedicated to a single, field-replaceable ATM Switch Processor module (ASP) that supports both the 5-Gbps shared memory, fully nonblocking switch fabric, together with its feature card, and the high-performance RISC processor that provides the central intelligence for the device. Uniquely, the ASP module feature card can also be upgraded in the field, allowing the switch to track changing ATM specifications. The remaining slots support up to four hot-swappable carrier modules (CAMs), each of which, in turn, can support up to two hot-swappable port adapter modules (PAMs), for a maximum of eight PAMs per switch, supporting a wide variety of desktop, backbone, and wide-area ATM interfaces.

The LightStream 1010 offers the sophistication and depth of functionality required for true ATM production deployment. Advanced traffic management mechanisms allow for the support of current, bursty, best-effort traffic, while also delivering the quality of service (QOS) guarantees required for the applications of the future. Available bit rate (ABR) congestion control support allows the LightStream 1010 to slow traffic sources before congestion becoms excessive, while support for the ATM Forum PNNI protocols allows networks of LightStream 1010s to scale to hundreds of nodes while still delivering interoperable, QOS-based routing. Value-add capabilities allow for ATM access lists and load sharing across redundant links. All of this sophistication is hidden, however, by the true standards-based, plug-and-play capabilities of the LightStream 1010, while advanced management functions allow for unprecedented levels of network visibility and control.

Figure 109 shows a LightStream 1010 with an optional redundant power supply installed, and Figure 110 shows the LightStream 1010 rear panel.

Figure 109 LightStream 1010 Switch Front View

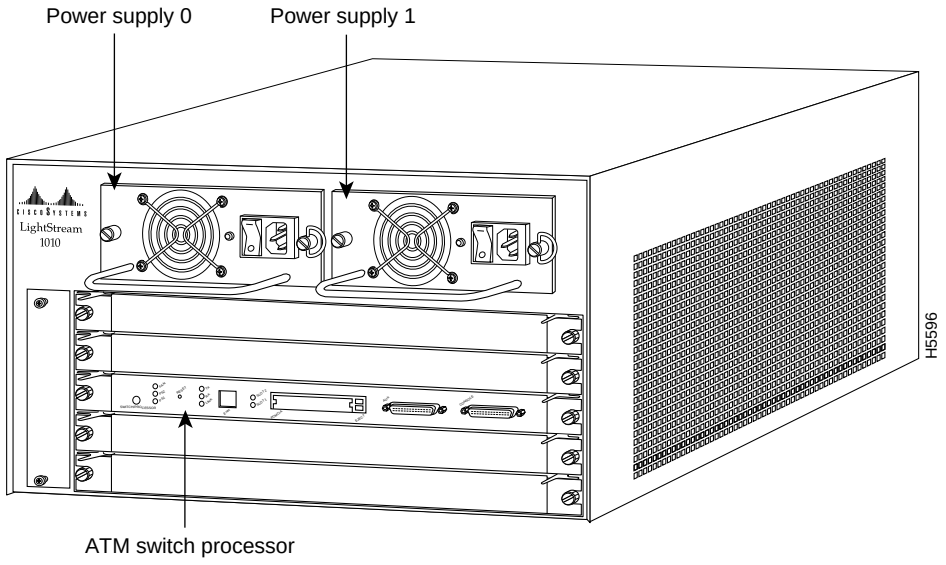


Figure 110 LightStream 1010 Switch Rear View

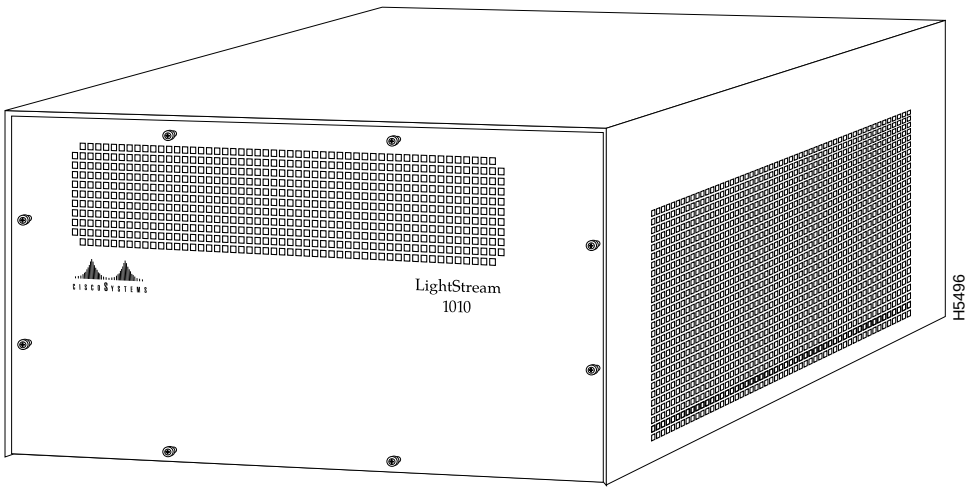


Table 245 LightStream 1010 Switch Summary of Features

Characteristic	Description
Switch and processor capacity	5-Gbps shared memory, nonblocking switch fabric 65,536 cells of shared ATM cell buffers 16-MB processor DRAM standard, maximum of 64 MB 8-MB Flash memory standard, internally expandable up to 16 MB plus up to 20 MB through PCMCIA Flash cards
Software images	Default image with IISP protocol Optional PNNI image with plug-and-play capability
Port adapter modules	PAM with 1 SONET STS12c/STM4c single-mode fiber port, SC connector PAM with 4 SONET STS3c/SDH STM1 multimode fiber ports, SC connectors PAM with 4 SONET STS3c/SDH STM1 single-mode fiber ports, SC connectors PAM with 4 SONET STS3c/SDH STM1 UTP-5 ports, SC connectors PAM with 1 SONET STS12c/SDH STM4c single-mode fiber port, SC connector PAM with 2 DS3 ports, BNC connectors PAM with 2 E3 ports, BNC connectors
Interface timing	Loop timing, Stratum 4 accuracy clock for self-timing, master clock distribution port
Management access	Standard Ethernet and dual EIA/TIA 232 serial ports on ASP module
Connections	32,000 point-to-point, 2,048 point-to-multipoint VC and VP switching, VP tunneling PVC and SVC F4 and F5 OAM segment and end-to-end flows, RDI and AIS OAM Ping on IP or ATM address
Signaling and routing	UNI 3.0, UNI 3.1 (available Q3 1996) ILMI PNNI Phase 1, IISP Soft PVC/PVP support ATM access lists and firewalls Crankback Plug-and-play mode with PNNI image Redundant link support with load balancing or best-fit selection

Characteristic	Description
Traffic management	Single, dual-mode leaky bucket traffic policing Per-port traffic pacing Multiple, configurable per connection, port, and switch thresholds Multiple priority classes All ATM connection types and AALs Connection admission control CLP tagging and discard Intelligent packet discard Available bit rate support: EFCI marking mode and relative rate marking mode
Network management	Port Rx and Tx LEDs, switch and common equipment status LEDs Port snooping and connection steering Multiple standard and enterprise MIBs Text-based command-line interface based on familiar router interface Standard Cisco IOS security capabilities: passwords and TACACS Telnet, TFTP, BOOTP, LAN Emulation client, RFC 1577 Classical IP over ATM client, for management access CiscoView GUI application for device configuration and management AtmDirector GUI system management application
MTBF	7.1 years for system configuration
Dimensions (H x W x D)	Chassis: 10.5 x 17.2 x 18.1"; standard 19-inch rack mount (26.7 x 43.7 x 46.1 cm) ASP and CAM: 1.2 x 14.4 x 16.0" (3.0 x 36.6 x 40.6 cm) PAM: 1.2 x 6.5 x 10" (3.0 x 16.5 x 25.4 cm)
Weight	Empty: 43 lbs (19.5 kg) Fully loaded: approximately 85 lbs (39 kg) (depends on loading).

Table 246 LightStream 1010 Switch Environmental Specifications

Description	Specification
Power supply	Maximum power budget: 9.8A @ 115 VAC, 60 Hz 4.9A @ 230 VAC, 50 Hz Auto sensing limits: 100-127/200-240 VAC, 8/4A, 47-63 Hz Maximum wattage: 376 W
Altitude	-500 ft to 10,000 ft (-52 m to 3,048 m)
Temperature	32 F to 104 F (0 C to 40 C)
Relative humidity	10 to 90% noncondensing
Safety certifications	UL 1950 EN 60950 CSA-C22.2 No. 950-93
Electromagnetic emissions certifications	FCC Class A (Part 15) EN 55022 Class B CE Mark VCCI Class II

Table 247 LightStream 1010 Product Numbers

Type	Description	Product Number
Chassis components	5-slot chassis, 1 power supply, 1 ATM Switch Processor module (16-MB DRAM, 8-MB Flash), slot covers for empty CAM slots, no power cord	L1010-BASE5
	Redundant power supply (installed in system)	L1010-PWR-1
	Power supply, no power cord (spare)	L1010-PWR-1=
	5-slot chassis, one power supply, no ASP (spare)	CHAS-L1010=
	AC power cord, US (installed)	CAB-7KAC
	AC power cord, US (spare)	CAB-7KAC=
	AC power cord, Europe (installed)	CAB-7KACE
	AC power cord, Europe (spare)	CAB-7KACE=
	AC power cord CD12, Italy (installed)	CAB-7KACI
	AC power cord CD12, Italy (spare)	CAB-7KACI=
	AC power cord, UK (installed)	CAB-7KACU
	AC power cord, UK (spare)	CAB-7KACU=
	AC power cord, Australia (installed)	CAB-7KACA
	AC power cord, Australia (spare)	CAB-7KACA=
	Carrier module for 2-port adapter modules with PAM slot covers for empty slots (installed)	WATM-CAM-2P
	Carrier module for 2-port adapter modules with 2 PAM slot covers (spare)	WATM-CAM-2P=
	CAM slot cover (spare)	WATM-CAM-CVR=
ASP options	ASP module, 16-MB DRAM, 8-MB Flash memory, no Flash card (default, installed)	WATM-ASP1
	ASP module, 16-MB DRAM, 8-MB Flash memory, no Flash card (spare)	WATM-ASP1=
DRAM options	ASP DRAM 16-MB SIMM (default, installed)	MEM-ASP-16M
	ASP DRAM 16-MB SIMM (spare)	MEM-ASP-16M=
	ASP DRAM 32-MB SIMM (installed)	MEM-ASP-32M
	ASP DRAM 32-MB SIMM (spare)	MEM-ASP-32M=
	ASP DRAM 64-MB SIMM (installed)	MEM-ASP-64M
	ASP DRAM 64-MB SIMM (spare)	MEM-ASP-64M=
Flash memory cards	PCMCIA Flash memory card, 8 MB (spare)	MEM-ASP-FLC8M=
	PCMCIA Flash memory card, 16 MB (spare)	MEM-ASP-FLC16M=
	PCMCIA Flash memory card, 20 MB (spare)	MEM-ASP-FLC20M=

Type	Description	Product Number
Port adapter modules	PAM—1 port STS12c/STM4c single-mode fiber (installed)	WAI-OC12-ISS
	PAM—1 port STS12c/STM4c single-mode fiber (spare)	WAI-OC12-ISS=
	PAM—4 ports STS3c/STM1 multimode fiber (installed)	WAI-OC3-4MM
	PAM—4 ports STS3c/STM1 multimode fiber (spare)	WAI-OC3-4MM=
	PAM—4 ports STS3c/STM1 single-mode fiber (installed)	WAI-OC3-4SS
	PAM—4 ports STS3c/STM1 single-mode fiber (spare)	WAI-OC3-4SS=
	PAM—4 ports STS3c/STM1 UTP-5 (installed)	WAI-OC3-4U5
	PAM—4 ports STS3c/STM1 UTP-5 (spare)	WAI-OC3-4U5=
	PAM—2 ports DS3, coaxial cable, BNC connectors (installed)	WAI-T3-2BNC
	PAM—2 ports DS3, coaxial cable, BNC connectors (spare)	WAI-T3-2BNC=
	PAM—2 ports E3, coaxial cable, BNC connectors (installed)	WAI-E3-2BNC
	PAM—2 ports E3, coaxial cable, BNC connectors (spare)	WAI-E3-2BNC=
	PAM slot cover (spare)	WAI-CVR=
Software images	IIISP feature set (installed default)	SF-WAS1-11.2.1
	IISP feature set (spare)	SW-WAS1-11.2.1=
	IISP feature license	FR-WAS1-11.X=
	PNNI/IISP feature set (installed)	SF-WAS2-11.2.1
	PNNI/IISP feature set (spare)	SW-WAS2-11.2.1=
	PNNI/IISP feature license	FR-WAS2-11.X=
	IISP to PNNI/IISP feature upgrade license	FR-WA-S1S2=
Service	LightStream 1010 SMARTnet maintenance	CON-SNT-L1010

Note For cable and connector information, see Table 326 and Table 327 in the chapter "Cables and Transceivers."

Standard Features

The LightStream 1010 switch includes the following standard features:

- Five-slot chassis (same as that of Catalyst 5000) with ATM backplane and fan tray
- Optionally redundant, auto-sensing, load-sharing power supplies, each with own power cord
- ASP module with field-replaceable feature card and 100-MHz MIPS R4600 processor running Cisco IOS software
- CAMs, each supporting up to two port adapter modules
- PAMs, each supporting a variable number of interfaces

The LightStream 1010 uses two management tools: AtmDirector and CiscoView.

AtmDirector

Using underlying ATM network management protocols such as the Interim Local Management Interface (ILMI), as well as standard and Cisco-private ATM MIBs, Cisco Systems' AtmDirector management application simplifies the installation and administration of ATM in switched internetworks.

AtmDirector is a graphical, system-level ATM management application for configuring, monitoring, and troubleshooting a network of Cisco LightStream ATM switches and ATM-attached Cisco routers and Catalyst LAN switches. The AtmDirector application automatically discovers and illustrates the topology of the ATM network, displays real-time link information, facilitates ATM network interrogation and troubleshooting by allowing selection of any virtual connection on an ATM link and tracing its entire path, and provides an intuitive interface for creating PVCs across the ATM network. AtmDirector may be integrated with popular SNMP management platforms or used as a fully functional, independent ATM network management application.

These advanced ATM management functions provide real-time status, statistics and configuration information, allowing the administrator to more easily understand and use the complex management data available for ATM networks.

ATM Director will be bundled with Cisco's advanced virtual LAN management application, running on top of CiscoWorks for Solaris.

CiscoView for the LightStream 1010

The CiscoView application for Cisco's LightStream 1010 ATM switch is a graphical user interface (GUI)-based device management application that provides dynamic status, statistics, and configuration information for the LightStream 1010. This application is a subset of the CiscoView application that offers similar features for other switched internetworking products such as Catalyst LAN switches and Cisco routers.

The CiscoView application is also included within CiscoWorks, Cisco's enterprise network management application suite. It displays a physical view of any Cisco device and shows real-time LED and interface status. The CiscoView application provides comprehensive monitoring functions and simplifies basic troubleshooting tasks.

Using the CiscoView application for the LightStream 1010, users can more easily understand the complex management data and configuration parameters available for ATM switches. It organizes this information into graphical representations presented in a clear, consistent format.

The CiscoView application for the LightStream 1010 can be integrated with several of the leading network management platforms, providing management application integration. It can also be run on UNIX workstations as a fully functional, independent LightStream 1010 management application. In addition, it can be launched from the AtmDirector topology map by simply double-clicking on a LightStream 1010 icon.

Configuration Guidelines

The default configuration for the LightStream 1010 is a chassis with a single power supply and ASP module with 16 MB of DRAM, and the default software image. Carrier modules and PAMs must be ordered separately. Two software images are available for the LightStream 1010—the default IISP image, which only supports the IISP protocol for ATM routing, and the PNNI image, which supports both the IISP and PNNI Phase 1 protocols. The LightStream 1010 uses the same power cords as the Cisco 7000 router and the Catalyst 5000.

When ordering a LightStream 1010 system that has been configured by the factory, the following items must be included on the purchase order:

- Base switch chassis (L1010-BASE5)—includes one power supply
- Country-specific power cord—included in base chassis price
- Base ASP module (WATM-ASP1)—included in base chassis price
- Required memory configuration; one of the following:
  - 16-MB DRAM (MEM-ASP-16M)—default, included in base chassis price
  - 32-MB DRAM (MEM-ASP-32M)—additional cost
  - 64-MB DRAM (MEM-ASP-64M)—additional cost
- Required software subset image; one of the following:
  - IISP feature set (SF-WAS1-11.2.1)—default, included in base chassis cost
  - PNNI/IISP feature set (SF-WAS2-11.2.1)—additional cost

All other components—redundant power supply, carrier modules, port adapter modules, and Flash memory cards—are options; these may be ordered at the same time as the base chassis if you want to have them installed in the factory. They can also be ordered as spares, as with the chassis, ASP, ASP DRAM SIMMs, and ASP Flash memory cards. Configuration rules should also be followed when ordering a spare ASP module; the cost of the default software image is included in the spare ASP price.

Carrier Modules and Port Adapters

Use the following guidelines to configure the LightStream 1010 carrier modules and port adapters:

- The amount of DRAM required on the ASP module is a function of the number of active physical and logical ports (VP tunnels) and the expected number of active switched virutal circuits (SVCs) through the switch. As a rough guide, use the following rules when determining the amount of DRAM to order for a switch with 32 physical ports:
  - Fewer than 4000 active SVCs: 16-MB DRAM
  - Between 4000 and 16,000 active SVCs: 32-MB DRAM
  - Between 16,000 and 32,000 active SVCs: 64-MB DRAM

- The base chassis does not ship with any carrier modules; these must be ordered separately. They can be ordered at the same time as the chassis if you want to have them installed in the factory. Since each CAM can support up to two PAMs, the minimum number of CAMs required varies with the number of supported PAMs as shown in Table 248, although you can order as many CAMs as you want (up to the maximum of four per switch):

Table 248 LightStream 1010 CAM Ordering

Number of Port Adapter Modules	Number of Required Carrier Modules
1	1
2	1
3	2
4	2
5	3
6	3
7	4
8	4

Note There is no switch slot dependency for CAMs—they can be plugged into any available switch slot. CAMs ordered as spares will be shipped with two PAM slot covers. CAMs installed in the factory will ship with PAM slot covers for any slots not occupied by PAMs.

- The base chassis does not ship with any port adapter modules; these must be ordered separately. They can be ordered at the same time as the chassis if you want to have them installed in the factory. Note, however, that an appropriate number of CAMs should be ordered at the same time as the PAMs when all components are ordered with a switch chassis. There are no slot dependencies for PAMs—these can be plugged into any available PAM slot on any CAM.
- The Flash memory PCMCIA cards are not required for the operation of the LightStream 1010 and can only be ordered as spares.
- The LightStream 1010 can accommodate the same DRAM and Flash memory SIMMs and the same PCMCIA Flash memory cards as the Cisco 7500 series RSP module.
- When ordering a spare software image, specify both the particular spare feature set (that is, SW-WAS2-11.2.1=) and the associated feature license (for example, FR-WAS2-11.X). The same procedure applies when ordering an upgrade—for instance, when upgrading from IISP to PNNI/IISP, specify both SW-WAS2-11.2.1= and FR-WA-S1S2=.

Example Orders

To order a base LightStream 1010 chassis with redundant power supplies, U.S. power cords, the default ASP module, the IISP image, two multimode fiber 155-Mbps PAMs (8 ports), and one DS3 PAM, all to be installed in the factory, use the product numbers in Table 249.

Table 249 LightStream 1010 Product Numbers—Example 1

Description	Product Number
Base chassis	1 x L1010-BASE5
ASP module (default)	1 x WATM-ASP1
16-MB DRAM (default)	1 x MEM-ASP-16M
IISP image (default)	1 x SF-WAS1-11.2.1
Redundant power supply	1 x L1010-PWR-1
U.S. power cords	2 x CAB-7KAC
Carrier modules	2 x WATM-CAM-2P
155-Mbps MMF PAM	2 x WAI-OC3-4MM
DS3 PAM	1 x WAI-T3-2BNC

To order a LightStream 1010 with 32 MB of DRAM, an 8-MB Flash memory PCMCIA card, European power cord, the PNNI/IISP image, three multimode fiber 155-Mbps PAMs (12 ports), and one E3 PAM, use the product numbers listed in Table 250.

Table 250 LightStream 1010 Product Numbers—Example 2

Description	Product Number
Base chassis	1 x L1010-BASE5
ASP module (default)	1 x WATM-ASP1
32-MB DRAM	1 x MEM-ASP-32M
European power cord	1 x CAB-7KACE
PNNI image	1 x SF-WAS2-11.2.1
8-MB Flash card (spare)	1 x MEM-ASP-FLC8M=
Carrier modules	2 x WATM-CAM-2P
155-Mbps MMF PAM	3 x WAI-OC3-4MM
E3 PAM	1 x WAI-E3-2BNC

Configuration Worksheets

Use the LightStream 1010 Configuration Worksheet that follows to help plan your order.

LightStream 1010 Configuration Worksheet

Chassis: LightStream 1010
Standard power supply: Included
Optional dual power supply: L1010-PWR-1
Rack-mounting hardware: Included

AC Power cord: U.S. (CAB-7KAC)—standard if not specified
Italy (CAB-7KACI)
U.K. (CAB-7KACU)
Australia (CAB-7KACA)
Europe (CAB-7KACE)

Cable management kit: Included

Base Chassis and Options	Product Number	
5-slot chassis, one ATM Switch Processor module, one power supply	L1010-BASE5	X
ASP module	WATM-ASP1[1]	X
ASP 16-MB SIMMs	MEM-ASP-16M[1]	
ASP 32-MB SIMMs	MEM-ASP-32M	
ASP 64-MB SIMMs	MEM-ASP-64M	
IISP feature set	SF-WAS1-11.2.1[1]	
PNNI/IISP feature set	SF-WAS2-11.2.1	

Interface Modules	Product Number	Slots				
		0	1	2	3	4
Carrier module for 2-port adapter modules	WATM-CAM-2P[2]					
PAM: 1 port STS12c/STM4c single-mode fiber	WAI-OC12-1SS[3, 4]					
PAM: 4 ports STS3c/STM1 multimode fiber	WAI-OC3-4MM[3, 4]					
PAM: 4 ports STS3c/STM1 single-mode fiber	WAI-OC3-4SS[3, 4]					
PAM: 4 ports STS3c/STM1 UTP-5	WAI-OC3-4U5[3, 4]					
PAM: 2 ports DS3, coax, BNC connectors	WAI-T3-2BNC[3, 4]					
PAM: 2 ports E3, coax, BNC connectors	WAI-E3-2BNC[3, 4]					

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1. Defaults included in base chassis price. You must specify either a default or an optional component.
2. Need one CAM for each two PAMs. Only one CAM per slot.
3. Specify which PAM(s) should be installed in the CAM in each slot. Maximum of two PAMs per CAM (and slot).
4. All PAMs and CAMs are also available as spares (=).

Maintenance and Spares	Product Number
SMARTnet maintenance	CON-SNT-L1010
Spare chassis, one power supply, no ASP	CHAS-L1010=
Spare power supply	L1010-PWR-1=
Spare ASP module	WATM-ASP1=
Spare ASP DRAM, 16-MB SIMMs	MEM-ASP-16M=
Spare ASP DRAM, 32-MB SIMMs	MEM-ASP-32M=
Spare ASP DRAM, 64-MB SIMMs	MEM-ASP-64M=
Spare PCMCIA Flash memory card, 8 MB	MEM-ASP-FLC8M=
Spare PCMCIA Flash memory card, 16 MB	MEM-ASP-FLC16M=
Spare PCMCIA Flash memory card, 20 MB	MEM-ASP-FLC20M=
Spare IISP feature set	SW-WAS1-11.2.1=[1]
IISP feature license	FR-WAS1-11.X=[1]
Spare PNNI/IISP feature set	SW-WAS2-11.2.1=[1]
PNNI/IISP feature license	FR-WAS2-11.X=[1]
IISP to PNNI/IISP feature upgrade license	FR-WA-S1S2=[1]
Spare CAM slot cover	WATM-CAM-VR=
Spare PAM slot cover	WAI-CVR=

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1. When ordering spare software, you must specify both the feature set and the corresponding feature license.